

WE CLAIM:

1. An immunogenic peptide of a target protein, said peptide which produces a disease or condition specific immune response in a host, wherein the target protein is causative of, or associated with, a targeted disease or condition, and said peptide 5 comprises the following structure:

(a) at least four to about one hundred amino acids in length;

(b) an amino acid sequence which is derived from a protein designated a "target" protein.

(c) a net hydrophilic structure as determined by the amino acid 10 sequence of the peptide, said structure located on the surface of the target protein;

(d) an amino acid net sequence homology of 50 percent or less as compared to the amino acid sequences of peptide regions on a comparative protein;

15 (e) an amino acid sequence wherein no more than three contiguous amino acids are homologous to contiguous amino acids on the comparative protein matching for overall homology; and

(f) an antigenic profile which elicits an immune response specific for the target protein.

20 2. A pharmaceutical composition comprising an immunogenic peptide of claim 1.

3. An immunogenic composition capable of inducing a mammal to produce antibodies specific for an epitope on a target protein, wherein the immunogenic composition comprises a peptide of claim 1.

25 4. An immunoassay for a target molecule to determine if the molecule is present in biological fluid, said immunoassay comprising:

(a) contacting a peptide of claim 1 with the biological fluid; and

(b) determining whether the peptide has complexed with an antibody

present in the biological fluid from which the presence of the targeted molecule in the fluid is inferred.

5. A diagnostic method for a disease or condition wherein a plurality of peptides of claim 1 are contacted to a microchip to detect a target protein that is 5 causative of, or associated with, the disease or condition, said target protein causing specific antibodies to be present in a biological fluid, said detection achieved by hybridization of antibodies in the biologic fluid to the plurality of peptides on the microchip.

6. A molecule which is specifically reactive with a peptide of claim 1.

10 7. A molecule which is specifically reactive with a reactive molecule of claim 6.

8. The molecule of claim 6, selected from the group consisting of monoclonal antibodies or immunogenic fragments thereof, recombinant proteins and adhesion proteins.

15 9. An immunoassay for a target protein, said immunoassay comprising:

- (a) obtaining a molecule of claim 6; and
- (b) determining whether the molecule complexes with the target protein of the peptide in a biological fluid.

10. A diagnostic method wherein a plurality of targeted proteins are placed 20 in a microchip to detect a microorganism, autoimmune disease, or allergy in a subject from which a biological sample is obtained, said microorganism, autoimmune disease, or allergy is detected by hybridization of targeted proteins to molecules in the biological sample.

11. An immune cell which is specifically reactive with a peptide of claim 1.

25 12. A method for identifying a peptide which functions as a highly specific antigen for a target protein, said method comprising:

- (a) selecting amino acid sequences of peptides of from 4 to 100 amino acids in length by copying the amino acid sequence of the target protein wherein the sequence satisfies the criteria of steps

(a) to (c) of claim 1;

(b) synthesizing candidate peptides that have the sequences of step (a);

(c) labeling the peptides at either the NH<sub>2</sub> or COOH end of their amino acid sequence with a detectable label; and

(d) testing by means of immunoassays whether the peptides are specific for the target protein.

5 13. An imaging reagent comprising a molecule of claim 7 and a label.

14. The imaging reagent of claim 13, wherein the label is radioisotopic and, 10 upon binding to microorganisms or diseased tissues highlights the presence of the microorganisms or diseased tissues when scanned with a nuclear medicine scanner.

15. The imaging reagent of claim 13, wherein the label is a paramagnetic label which, upon binding to microorganisms or diseased tissue highlights the presence of the microorganisms or diseased tissue when scanned with a nuclear magnetic resonance (NMR) scanner.

16. The imaging reagent of claim 13, wherein the label comprises a water density label which, upon binding to microorganisms or diseased tissues highlights the presence of the microorganisms or diseased tissues when scanned with a CAT scanner.

17. An anti-microbial therapeutic construct comprising a peptide of claim 1.

20 18. The therapeutic construct of claim 17 further defined as comprising the peptide coupled to an adjuvant molecule which enhances immunogenicity of the peptide.

19. The therapeutic construct of claim 17, further defined as comprising neomolecules created by recombinant techniques comprising a peptide with adjuvant molecular sequences which promote increased immunogenicity of the peptide of claim 25 1.

20. A anti-microbial therapeutic construct comprising a nucleic acid molecule comprising a nucleotide sequence that encodes a peptide of claim 1, said nucleic acid molecule being administered to the cells of an individual and then expressed by the individual's cells as a protein or peptide for the purpose of auto-stimulation of the

individual's immune system.

21. A method of producing anti-microbial immunity comprising obtaining and administering an effective amount the construct of claim 17 to a mammal.
22. A desensitizing reagent comprising at least one peptide of claim 1, said reagent used to down-regulate a specific immune response administered to a host affected with a targeted disease:
  - (a) in initial doses too weak to up-regulate causing immune response the disease; and
  - (b) incrementally increasing the dosage to induce immune tolerance to a specific antigen causing the disease thereby abrogating or ameliorating the disease process.

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